In the Claims

The claims have been amended as follows.

1. (currently amended) A method of forming substantially cylindrical conductors comprising:

providing an intermetal dielectric layer;

depositing a hard mask layer over said intermetal dielectric layer;

etching an opening in said hard mask layer in a location corresponding to where a substantially half cylindrical wire is to be formed;

isotropically etching said intermetal dielectric layer in a location corresponding to said opening at a substantially constant rate to form a substantially half cylindrical trench opening in said intermetal dielectric layer having dimensions larger in comparison to dimensions of said opening in said hard mask layer; ~~and~~

filling said substantially half cylindrical trench opening with a high conductivity metal to form said substantially half cylindrical wire in said intermetal dielectric layer; and

removing said hard mask layer and a portion of said high conductivity metal.

2. (original) The method of claim 1 wherein said intermetal dielectric layer comprises a low-k intermetal dielectric layer.

3. (canceled)

4. (original) The method of claim 1 wherein said intermetal dielectric layer comprises a $Si_wC_xO_yH_z$ based intermetal dielectric layer wherein w, x, y and z range from about 0-1, said $Si_wC_xO_yH_z$ based intermetal dielectric layer being isotropically etched using an etchant selected from the group consisting of an aqueous dilute HF and a vapor HF.

5. (original) The method of claim 4 further including, prior to the step of isotropically etching said $Si_wC_xO_yH_z$ based intermetal dielectric layer, anisotropically etching said SiO2-based intermetal dielectric layer to obtain a substantially vertical trench profile having a desired trench depth of said substantially half cylindrical trench opening.

6. (original) The method of claim 5 wherein said $Si_wC_xO_yH_z$ based intermetal dielectric layer is anisotropically etched by reactive ion etching using an etchant selected from the group consisting of perfluorocarbon-based etchant and a hydrofluorocarbon-based etchant.

7. (original) The method of claim 1 wherein said intermetal dielectric layer comprises an organic polymer intermetal dielectric layer, said organic polymer intermetal dielectric layer is isotropically etched using an etchant selected from the group consisting of an H_2, N_2, 0_2 , He and Ar plasma.

8. (original) The method of claim 7 further including, prior to the step of isotropically etching said organic polymer intermetal dielectric layer, anisotropically etching said organic polymer intermetal dielectric layer to obtain a substantially vertical trench profile having a desired trench depth of said substantially half cylindrical trench opening.

9. (original) The method of claim 8 wherein said intermetal dielectric layer comprises an organic polymer intermetal dielectric layer, said organic polymer intermetal dielectric layer is isotropically etched by reactive ion etching using an etchant selected from the group consisting of an H_2, N_2, 0_2 , He and Ar plasma.

10. (original) The method of claim 1 wherein said opening in said hard mask layer has a width "*w1*" and said substantially half cylindrical trench opening has a depth "d" and a largest width "*w2*", said largest width "*w2*" being a function of said opening in said hard mask layer represented as "*w2*" = "*w1*" + (2)(d).

11. (original) The method of claim 1 further including depositing a conductive liner layer within said substantially half cylindrical trench opening prior to filling said substantially half cylindrical trench opening with said high conductivity metal.

12. (currnetly amended) The method of claim 1 further including the steps of ~~removing any remaining hard mask layer~~;

removing a portion of said intermetal dielectric layer at least in a location surrounding said substantially half cylindrical wire, thereby exposing a top surface of said substantially half cylindrical wire;

etching said exposed top portion of said substantially half cylindrical wire to transform said substantially half cylindrical wire to a substantially cylindrical wire; and

depositing additional dielectric material to at least encapsulate said substantially cylindrical wire.

13. (currently amended) A method of forming substantially cylindrical conductors comprising:

providing a first intermetal dielectric layer;

providing ~~at least~~ a second intermetal dielectric layer over said first intermetal dielectric layer;

providing a third intermetal dielectric layer over said second intermetal dielectric layer

depositing a hard mask layer over said ~~at least second~~ third intermetal dielectric layer;

etching an opening in said hard mask layer in a location corresponding to where a substantially cylindrical wire is to be formed;

sequentially etching said ~~at least~~ third, said second and said first intermetal dielectric layers to form a substantially cylindrical trench opening traversing through said ~~at least~~ third, said second intermetal dielectric layer and extending into said first intermetal dielectric layer, said second intermetal dielectric layer selectively etching faster than said first and third intermetal dielectric layers so that said etch front partially undercuts bottom corner portions of said second intermetal dielectric layer for forming said substantially cylindrical trench opening, said substantially cylindrical trench opening having dimensions larger in comparison to dimensions of said opening in said hard mask layer; and

filling said substantially cylindrical trench opening with a high conductivity metal to form said substantially cylindrical wire in said ~~at least~~ second and first intermetal dielectric layers.

14. (canceled)

15. (currently amended) The method of claim ~~14~~13 wherein said first, second and third intermetal dielectric layers are doped with dopants at varying concentrations, said second intermetal dielectric layer being doped with a concentration of dopants that allows said second intermetal dielectric layer to etch faster than said first and third intermetal dielectric layers for forming said substantially cylindrical trench opening.

16. (currently amended) The method of claim ~~14~~13 wherein said first, second and third intermetal dielectric layers comprise first, second and third porous intermetal dielectric layers having varying amounts of porosity, said second intermetal dielectric layer having a highest amount of porosity such that said second intermetal dielectric layer etches faster than said first and third intermetal dielectric layers for forming said substantially cylindrical trench opening.

17. (currently amended) The method of claim 13 wherein said ~~at least~~ second dielectric layer comprises a first graded dielectric layer having at least one constituent element thereof varied in concentration as said first graded dielectric layer is deposited over said first dielectric layer, said at least one constituent element being varied in a manner that allows said first graded dielectric layer to etch slowest at a top surface of said first graded dielectric layer and fastest at a bottom

surface of said first graded dielectric layer, for forming said substantially cylindrical trench opening.

18. (original) The method of claim 17 wherein said first dielectric layer comprises a second graded dielectric layer having at least one constituent element thereof varied in concentration in a manner that allows said second graded dielectric layer etch fastest at a top surface, which is in contact with said first graded dielectric layer, and slowest at a bottom surface of said second graded dielectric layer, for forming said substantially cylindrical trench opening.

19. (currently amended) A conductive interconnect structure for preventing cracks in a dielectric layer on a substrate comprising:

at least a first intermetal dielectric layer;

at least a second intermetal dielectric layer over said first intermetal dielectric layer;

a substantially cylindrical trench opening traversing through said at least second intermetal dielectric layer and extending into ~~in~~ said at least first intermetal dielectric layer;

a high conductivity metal filling said substantially cylindrical trench opening to form a substantially cylindrical wire residing in both said at least first and said at least second intermetal dielectric ~~layer~~layers, said substantially cylindrical wire substantially avoiding propagation points for starting cracks in said at least first intermetal dielectric layer.

20. (canceled)